CLAIMS

1. Device comprising an electron donor structure containing at least one type of conjugated polymer, and an electron acceptor structure containing at least one type of tubular nanostructure having at least one complexed or adsorbed pigment on its surface.

2. Device according to claim 1 or 2, characterized in that the tubular nanostructure is selected from the group comprising straight and/or bent Single-wall, double-wall and multi-wall carbon nanotubes (SWNT, DWNT and MWNT) and any mixture of these.

3. Device according to claim 1 or 2, characterized in that the pigment complexed on the tubular nanostructure is selected from inorganic pigments treated so as to be compatible with a polymer or an organic solvent, azo pigments, yellow and orange monoazo pigments, diazo pigments, naphthol pigments, Naphthol® AS pigments (naphthol red), azo pigment lakes, benzimidazolone pigments, diazo condensation pigments, complex metal pigments, isoindolinone and isoindoline pigments, polycyclic pigments, phthalocyanine pigments, a sulfonated copper phthalocyanine containing an average of 0.5 to 3 sulfonic acid groups, a chlorinated copper phthalocyanine, an aluminum phthalocyanine, a brominated phthalocyanine, an aluminum phthalocyanine, a metal-free phthalocyanine, quinophthalone pigments, indathrone pigments, yellow diacrylide pigments, diazopyrazolone pigments, azo-metal pigments, triarylcarbonium pigments, rhodamine lake pigments, perylene pigments, quinacridone pigments and diketopyrrolopyrrole pigments, molecules of porphyrin or derivatives thereof, and mixtures of two or more of all these.

4. Device according to any one of the preceding claims, characterized in that the typical diameter of the nanostructures in question is in the nanometer range and preferably between 0.5 and 200 nanometers, the preferred nanostructures being carbon nanotubes, especially Single-wall carbon nanotubes with a preferred form factor of more than 150 and multi-wall carbon nanotubes with a preferred form factor of more than 5.

5. Device according to any one of the preceding claims, characterized in that the tubular nanostructure has a layer of at least one pigment directly adsorbed on its outer periphery, and at least one polymer having an anchoring point on said layer of at least one pigment.

6. Device according to claim 5, characterized in that the polymer having an anchoring point on said layer of at least one pigment is a hydroxyoctadecanoic acid/ aziridine block copolymer.

7. Device according to claim 5 or 6, characterized in that the weight ratio nanotubes/pigment/polymer is between 1/1/1 and 1/5/1.

8. Device according to any one of the preceding claims, characterized in that the pigment is phthalocyanine.

9. Device according to any one of the preceding claims, characterized in that the conjugated polymer is selected from the group comprising polyacetylenes, polyparaphenylenes, polypyrrole sulfides, polyparaphenylene sulfides, poly-thiophenes, polyphenylene vinylenes, poly-3-methylthiophene, polycarbazole, polyisothianaphthene, poly(1,6-heptadiyne), poly-3-alkylthiophene in which the chosen alkyl is especially C_1-C_5, poly(3,4-ethylenedioxythiophene) or PEDOT, polyquinoline, poly-3-alkylsulfonate in which the chosen alkyl group is especially C_1-C_5, and polyaniline and derivatives thereof, preferably polyphenylene vinylenes and poly(3-octylthiophenes).

10. Device according to any one of the preceding claims, characterized in that the tubular nanostructure functions as an electron acceptor structure mixed with a binding polymer, the binding polymer preferably representing less than 50% by weight of the electron acceptor structure.

11. Device according to any one of the preceding claims, characterized in that the electron acceptor structure and electron donor structure are mutually discernible or form a composite structure.

12. Device according to any one of the preceding claims, characterized in that it forms a PN heterojunction of a photovoltaic cell.

13. Process for the manufacture of a device as defined in claims 1 to 12 containing at least one type of conjugated polymer, characterized in that it comprises a step for forming a structure functioning as an electron acceptor structure which comprises at least one type of tubular nanostructure, which in turn comprises at least one complexed or adsorbed pigment on its surface.

14. Manufacturing process according to claim 13, characterized in that the tubular nanostructures are assembled in the form of a paper or mat of nanotubes by deposition from a suspension containing tubular nanostructures.

15. Manufacturing process according to claim 13 or 14, characterized in that the tubular nanostructures assembled in the form of a paper undergo a treatment to

increase the contact area with the electron donor structure.

16. Manufacturing process according to any one of claims 13 to 15, characterized in that the electron donor structure is deposited from a solution of conjugated polymer or from molten conjugated polymer, or from any other similar preparation, deposition being effected by injection, spin coating or any other similar method.

17. Manufacturing process according to claim 13, characterized in that the device comprises a composite structure forming the electron acceptor structure and the electron donor structure, said composite structure being produced by mixing, in solution, tubular nanostructures with the conjugated polymer, or by a molten method, or by any other similar technique, it being possible for the dispersion of nanostructures in the conjugated polymer to be homogeneous or to follow a gradient.

18. Photovoltaic cell, characterized in that it comprises a device as defined in claims 1 to 12 or formed by a process as defined in claims 13 to 17.

19. Method of producing electricity from an electromagnetic wave, characterized in that it comprises:

a) the use of a device as defined in claims 1 to 12 for effecting a photovoltaic conversion.

20. Method of producing electricity from an electromagnetic wave, characterized in that it comprises:

a) the bringing of a photovoltaic cell as defined in claim 18 into contact with an electromagnetic wave emitted especially by the sun, and

b) the generation of electricity from said photovoltaic cell.